# A DISCUSSION OF SENSITIVITY ANALYSIS FOR THE IDENTIFICATION OF POROELASTIC MATERIAL PARAMETERS

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The spread of the finite element methods and the growth of the computational power of computers permitted an important develeppement of numerical identification methods for material parameters. Within this framework the identification problem of the material parameters, which can be qualified as an inverse problem from the mathematical point of view, can be reformulated as an optimization problem for a given cost functional. This problem can now be solved by a classical minimization method. As a consequence the main technical difficulty remains the computation of the gradient of the cost functional. This gradient can be translated into sensitivities, i.e. gradients of the mechanical fields with the respect to the parameters.

In this paper we shall discuss the adjoint and the direct differention methods for quasi-static linear poroelasticity. The equations are established under the hypothesis of small displacement, strain, variations of fluid contents and fluid flow vector.

In the first part, we shall present the poroelastic governing equations [1, 4, 2]. The now classical adjoint and direct differentiation methods, presented for elastic systems for example in [7] and for the heat conduction problem in [3], will be formulated for the poroelastic equations. Then we shall discuss the main difference with existing results [6, 5] for less coupled models.

In a series of examples using simulated and real measurements, we will apply the previous methods to the indentification of poroelastic constants.

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**References**
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